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sion of polarization currents, Faraday's law, ion transference, preliminary experiments, etc.; and the concluding chapter discusses the construction and calibration of instruments, such as the tangent galvanometer and those used for measuring pressure and regulating resistance. Tables of electro-chemical equivalents of the more important elements, of thermo-chemical data, and of wire resistance, are appended.

The second book, as its title implies, is in part of a more practical character. The first forty pages are given again to a discussion of instruments, but the remainder is devoted to a discussion of simple electro-chemical experiments, such as electrolysis of hydrochloric acid with and without a diaphragm; electrolysis of dilute sulphuric acid, or sodium hydroxide, with a diaphragm; formation of persulphuric acid by the electrolysis of sulphuric acid; precipitation of copper under different conditions; precipitation of magnesium from a fused salt of the metal; the number of processes involved being sufficient to give some idea of electro-chemical operations.

The final chapter, on 'Organic Electrolysis,' was written by Professor Elbs and is one of the most interesting chapters in the book. In a very few experiments it gives some idea of the application of electrolysis to organic chemistry, an idea which is, however, greatly enlarged by such a work as the third volume of Peters' 'Angewandte Elektrochemie.'

The translation by Professor Smith is especially welcome, not simply because of his skill in such work, but since it comes from the leading authority in practical electro-chemistry in America.

H. C. J.

SCIENTIFIC JOURNALS.

The Journal of Geology, May-June, 1898: The number opens with 'A Symposium on the Classification and Nomenclature of Geologic Time-Divisions,' a contribution that is based on a series of fourteen questions that had been submitted to the geologists mentioned below. The questions involve a discussion of the extent to which subdivision should be pursued in the time and physical scales, and of the number of

geological periods (as the word period was used by the Berlin Congress) which it is desirable to adopt. Considerable difference of opinion is developed, so much so as to make the average teacher impatient with this continual tinkering with words. Opinions are expressed by Joseph Le Conte, G. K. Gilbert, W. B. Clarke, S. W. Williston, Bailey Willis, C. R. Keyes and Samuel Calvin. 'Probable Stratigraphical Equivalents of the Coal Measures of Arkansas,' by C. R. Keyes. The author cites the great thickness of the Arkansas Coal Measures as compared with those of Iowa and Missouri, *i. e.*, 2,400 feet as against 500-600, and strongly opposes the ordinary conception of the Ozark island of Carboniferous and later time. He emphasizes the evidence that land conditions followed the deposition of the St. Louis limestone and preceded the formation of the Iowa and Missouri Coal Measures. He explains the greater thickness of the Arkansas measures by their continuity of deposition without regard to this change on the north. A paper 'On the Origin of certain Siliceous Rocks' is presented in two parts. The first, by O. A. Derby, contains 'Notes on Arkansas Novaculite,' and gives the results of an investigation of the novaculite by crushing it to slimes without destroying the larger included grains of secondary quartz. The slimes were then studied with the microscope, and the author reached the conclusion that an origin by replacement of cherty limestone has great claims to confidence. J. C. Branner, in the second part, comments on these results and systematically reviews the explanations that have been advanced for the siliceous rocks. He adds a few notes on those in California. 'A Study of Some Examples of Rock Variation,' by J. M. Clements, deals with an interesting series of eruptives at Crystal Falls, Mich., which follow the Upper Huronian and precede the Potsdam. The series consists of quartz-diorite, hornblende-gabbro, bronzite-norite and peridotite, and is described in detail with analyses. The hornblende-gabbro was first in time; then came the norite and peridotite, and, last of all, the diorite with transitions into granite. Under the 'Studies for Students' a good brief review of the development and geological relations of the fishes is given by E.

C. Case. It is meant to be the first of a series on vertebrates. Editorials and reviews close the number.

The Journal of Geology, July-August, 1898 : 'The Ulterior Basis of Time Divisions and the Classification of Geologic History :' T. C. Chamberlin. Apropos of the symposium in the last number the author seeks some world-wide parallel, geologic phenomena which may afford a suitable basis for geological classification. He urges the possible validity of great geologic disturbances, which he argues are in the nature of general shortening of all the radii of the earth, but of comparatively greater shortening of those under the sea bottoms. The effects on the regions of sedimentation and continental encroachment on the sea are indicated. 'The Post-glacial Connecticut at Turner's Falls, Mass.' M. S. W. Jefferson. The paper describes the interesting rearrangements of drainage lines along the Connecticut river near the famous 'bird-track' quarries. The agency of ice is invoked to explain the two abandoned channels, with their former waterfalls and potholes, which now are ponds. 'The Variations of Glaciers, III.' H. F. Reid. Reports during 1897 to the International Committee indicate a marked retreat of glaciers in general, with one or two small advances in Scandinavia. 'Notes on the Kalamazoo and other Old Glacial Outlets in Southern Michigan.' C. H. Gordon. The paper deals with several abandoned river channels and their relations to the modern streams. The region lies along the general latitude of Port Huron and extends from Lake Huron to Lake Michigan. The paper is accompanied by a map whose excessive reduction taxes the eyesight beyond reason. 'Notes on some Igneous, Metamorphic and Sedimentary Rocks of the Coast Ranges of California.' H. W. Turner. This valuable contribution takes up first the metabasalts and diabases of the Coast Ranges. More or less altered rocks are traced back to original, eruptive diabases, although in some instances they had been regarded previously by geologists as metamorphosed sediments, *i. e.*, pseudodiabases. Observations on serpentines are also given. The author next discusses the Francis-

can, or Golden Gate formation. This contains the interesting blue amphibole (glaucophane) schists that are generally familiar to petrographers. The age of the formation is thought to be older than that of the Knoxville, *i. e.*, to be Jurassic. An argument is made against the necessary origin of the blue schists by contact metamorphism. The San Pablo formation is next taken up and its stratigraphical position is discussed on the basis of fossils. Comparisons are drawn with the auriferous gravels. Under the 'Studies for Students,' E. C. Case continues his brief review of the development and geological relations of the vertebrates, and treats of the Amphibia and Reptilia. Editorial remarks, a number of summaries of pre-Cambrian literature and reviews close the number.

NEW BOOKS.

The Tides, and Kindred Phenomena in the Solar System. GEORGE HOWARD DARWIN. Boston and New York, Houghton, Mifflin & Co. 1898. Pp. xviii+378.

A Manual of Chemical Analysis. G. S. NEWTH. New York and London, Longmans, Green & Co. 1898. Pp. xii+462.

Manual of Determinative Mineralogy with an Introduction on Blowpipe Analysis. GEORGE J. BRUSH. Revised by SAMUEL L. PENFIELD. Fifteenth Edition. New York, John Wiley & Sons; London, Chapman & Hall, Ltd. 1898. Pp. x+312.

Elementary Zoology. FRANK E. BEDDARD. New York and London, Longmans, Green & Co. 1898. Pp. vi+208.

Lecture Notes on the Theory of Electrical Measurements. WILLIAM A. ANTHONY. New York, John Wiley & Sons; London, Chapman & Hall, Ltd. 1898. Pp. vi+90. \$1.00.

Human Immortality; Two Supposed Objections to the Doctrine. WILLIAM JAMES. Boston and New York, Houghton, Mifflin & Co. 1898. Pp. 70. \$1.00.

The Copper Dam Process for Piers; Practical Examples from Actual Work. CHARLES EVAN FOWLER, Bridge Engineer. New York, John Wiley & Sons. 1898. 8vo. Pp. xv+159. \$2.50.